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EARLY TERTIARY VERTEBRATE FAUNAS
BIG BEND AREA TRANS-PECOS TEXAS:
SIMIDECTES (MAMMALIA, INSECTIVORA)

By Eric Paul Gustafson

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Texas Memorial Museum/2400 Trinity/Austin, Texas 78705
William G. Reeder, Director

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BIG BEND AREA TRANS-PECOS TEXAS:
SIMIDECTES (MAMMALIA, INSECTIVORA)¹

By Eric Paul Gustafson²

ABSTRACT

Several specimens from the Buck Hill Group, Agua Fria area, Texas, represent *Simidectes magnus*, a species previously reported only from the Uinta Formation of Utah. Statistics of known specimens of *Simidectes* are inadequate to demonstrate the existence of more than one species in the Utah and Texas sections; *S. medius* may be a junior synonym of *S. magnus*. In the lower part of the section at Agua Fria, *Simidectes* occurs in the Whistler Squat local fauna of late Bridgerian or early Uintan age; in the upper part of the section it is found in association with an early *Hyaenodon* and the adapid primate *Mahgarita stevensi*.

INTRODUCTION

Bones and teeth of numerous mammals of middle to late Eocene age are known from the Buck Hill Group in the Agua Fria area northwest of Big Bend National Park, Texas. Among the specimens selected for a study of the carnivorous mammals of this area (Gustafson, 1977) are several which represent the poorly known late Eocene genus *Simidectes*. The purpose of this paper is to describe these specimens and to assess their taxonomic and biostratigraphic significance.

Abbreviations used: AP, antero-posterior measurement; e, approximate measurement; N, sample size; T, transverse measurement; R, numerical range; s, standard deviation; V, coefficient of variation; \bar{X} , arithmetic mean; AMNH, American Museum of Natural History, New York; CM, Carnegie Museum, Pittsburgh; KU, University of Kansas, Lawrence; LACM, Los Angeles County Museum; PU, Princeton University; TMM, Texas Memorial Museum, Austin.

All measurements are in millimeters. Detailed descriptions of localities are on file at the Vertebrate Paleontology Laboratory, Texas Memorial Museum, The University of Texas at Austin 78705. This work was supported in part by the Geology Foundation, Department of Geological Sciences, The University of Texas at Austin.

¹Contribution from the Vertebrate Paleontology Laboratory, Texas Memorial Museum, The University of Texas at Austin.

²Department of Geology, University of Oregon, Eugene, Oregon 97403.

PREVIOUS WORK

Simidectes has been reported previously only from the Sespe Formation of California and the Uinta Formation of Utah. The taxonomy and morphology of the known species are summarized by Coombs (1971).

The faunas of the Agua Fria area are only partly described. Much taxonomic work is available from Wood (1972, 1973; Rodentia), Wilson (1974; *Leptoreodon*), Stevens et al. (1975; mainly stratigraphy but mentions *Hyaenodon*), Wilson and Szalay (1976; primate, but the paper also mentions an amynodont rhinoceros, artiodactyls, and *Hyaenodon*), and Wilson (1977; titanotheres).

The detailed stratigraphy of the sedimentary rocks and tuffs of the Buck Hill Group in the Agua Fria area has been worked out by J. A. Wilson and James and Margaret Stevens but is not yet published, though preliminary conclusions have been discussed (Stevens et al., 1975). Moon (1953) mapped the geology of the Agua Fria quadrangle. The fossiliferous sediments lie between the post-Cretaceous unconformity and the Mitchell Mesa Ignimbrite. A new formational name has been suggested but not yet published.

CORRELATIONS

Whistler Squat local fauna—Wilson (personal communication, 1977) includes all localities in the Agua Fria section up through Purple Bench in the Whistler Squat local fauna. The rodents from this local fauna were first described by Wood (1973) as coming from two localities in the lowest part of the section. The same part of the section also yielded two specimens of *?Proviverra major*, which is otherwise known only from the Bridger Formation of Wyoming and probably only the upper Bridger (Gazin, 1976, p. 10). A suggested Bridgerian age agrees with the determination given by Wood (1973) on the basis of the rodents from Whistler Squat, within 50 feet of the base of the section. However, of the other carnivorous mammals from the lower part of the Agua Fria section, *Hessolestes* is otherwise known from only one specimen from the Lapoint Member of the Duchesne River Formation, possibly latest Uintan, and *Simidectes magnus* is known from both the Wagonhound and Myton Members of the Uinta Formation. Both of these suggest an age younger than Bridgerian. It may be significant that the localities from which the *Simidectes* specimens and two of the three *Hessolestes* specimens came are higher in the section than those from which *?Proviverra* came (Fig. 1). Other carnivorous mammal specimens are too fragmentary for correlation. The presence of *Leptoreodon marshi* in the lower 50 feet of the Agua Fria section (Wilson, 1974) further supports a post-Bridgerian age assignment for the Whistler Squat local fauna.

The radiometric dates of 46 m.y. and 43 m.y. at Whistler Squat (Wilson and Szalay, 1976) would fix the age of the lower part of the section as Uintan if the Uintan-Bridgerian boundary is about 47 m.y. (McKenna et al., 1973).

AGUA FRIA AREA
Buck Hill Group

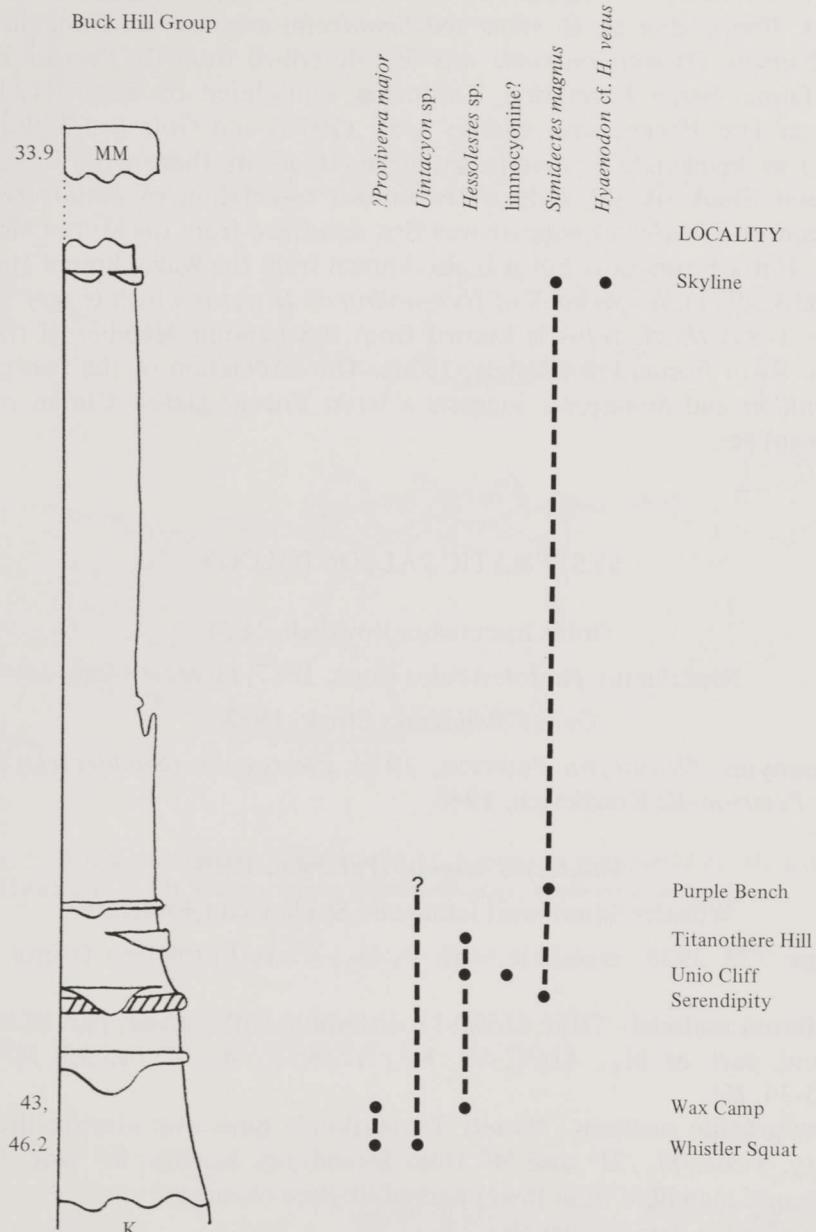


Fig. 1.—Stratigraphic checklist—Agua Fria section, Brewster Co., Texas, Buck Hill Group. Diagrammatic sections show relative thicknesses of units; unit marked with diagonal lines is informally called “Strawberry tuff.” MM = Mitchell Mesa Ignimbrite, K = Cretaceous rocks; names of some localities shown; numbers next to MM and Whistler Squat are radiometric dates in millions of years. All localities below Skyline are parts of the Whistler Squat local fauna.

Skyline channels—An adapid primate (*Mahgarita stevensi*) was described from this locality by Wilson and Szalay (1976). Two carnivorous mammal species, *Hyaenodon* cf. *H. vetus* and *Simidectes magnus*, are from the Skyline channels. *Hyaenodon vetus* was first described from the Pearson Ranch local fauna, Sespe Formation, California, considered by Stock (1948) as being of late Eocene age, and by Golz (1976) and Golz and Lillegraven (1977) as being late Eocene-Duchesnean. It occurs there with *Simidectes merriami* Stock, in the only other known association of *Simidectes* and *Hyaenodon*. *Simidectes magnus* was first described from the Myton Member of the Uinta Formation, but it is also known from the Wagonhound Member (Coombs, 1971). A specimen of *Hyaenodon* cf. *H. vetus* which is very similar to the Texas *H. cf. vetus* is known from the Lapoint Member of the Duchesne River Formation (Mellett, 1977). The association of the two genera *Hyaenodon* and *Simidectes* suggests a latest Eocene (latest Uintan or Duchesnean) age.

SYSTEMATIC PALEONTOLOGY

Order Insectivora Bowdich, 1821

Superfamily Pantolestoidea Cope, 1887, *incertae sedis*

Genus *Simidectes* Stock, 1933

Synonyms—*Pleurocyon* Peterson, 1919; *Pleurocyon* (*Simidectes*) Stock, 1933; *Petersonella* Kraglievich, 1948.

Simidectes magnus (Peterson, 1919)

Whistler Squat local fauna and Skyline conglomerate

Type—CM 2928, mandible with P_3 - M_2 , Uinta Formation (Uinta "C"), Utah.

Referred material—TMM 41580-11, mandible with canine, part of P_3 , P_4 , M_1 and part of M_2 ; 41672-57, M^3 ; 41745-5, M_3 ; 41745-33, M^2 ; and 41745-34, M^1 .

Stratigraphic position—“Pruett Formation,” Buck Hill Group, Brewster County, Texas; M_3 , M^1 and M^2 from Serendipity locality; M^3 from Purple Bench; and mandible from lower part of Skyline channels.

Age—Uintan, late Eocene.

Description—The specimens assigned here show the distinctive characters described by Coombs (1971), particularly the deep, narrow jaw with a large, laterally compressed canine, P_4 large and submolariform, relatively rounded cusps on the molars, enlarged hypoconids, and lack of cingula, especially lack of lingual cingula on upper molars. On 41580-11, only the canine and M_1 are complete, but the nature and approximate size of P_4 and M_{2-3} are apparent from remaining fragments and alveoli.

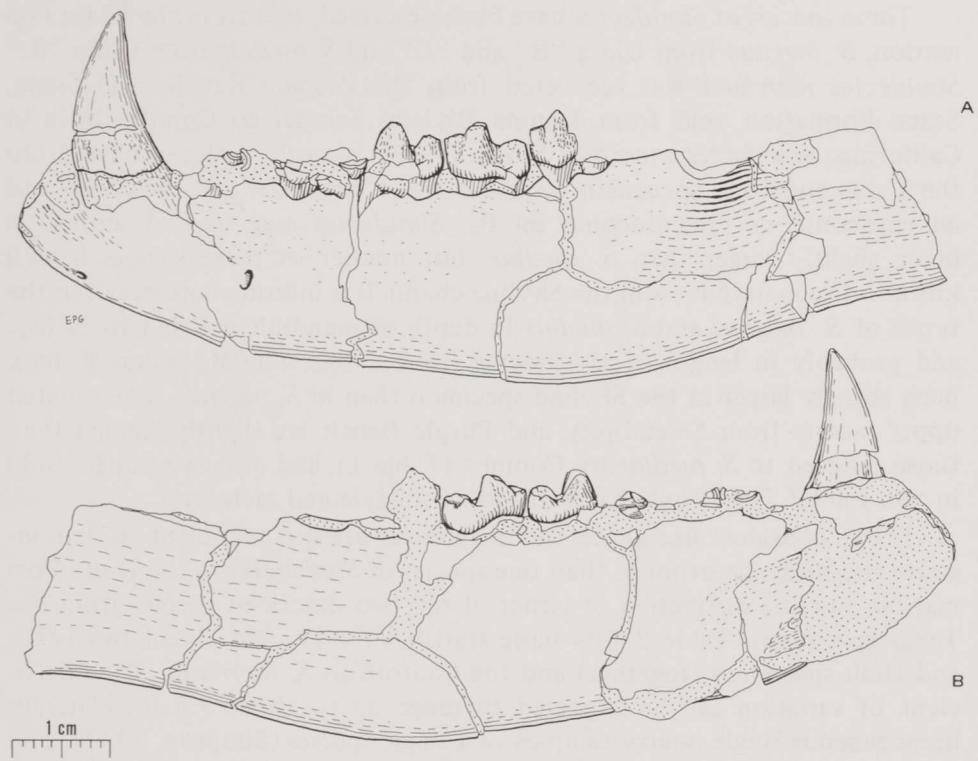


Fig. 2.—*Simidectes magnus*, TMM 41580-11. Lower jaw with partial P₄, M₁ and partial M₂. A, external and B, internal views. Skyline locality, Brewster County, Texas.

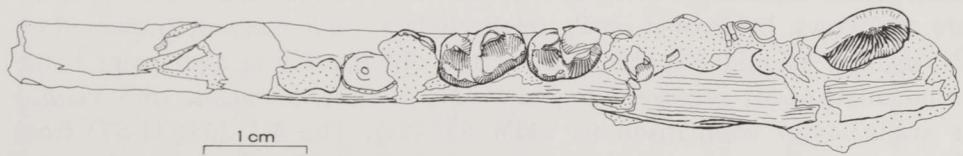


Fig. 3.—*Simidectes magnus*, TMM 41580-11. Dorsal view, anterior to right.

RELATIONSHIPS

Three species of *Simidectes* have been described, two from the Uinta Formation, *S. magnus* from Uinta "B" and "C" and *S. medius* from Uinta "B." *Simidectes merriami* was recovered from the Pearson Ranch local fauna, Sespe Formation, and from Laguna Riviera, San Diego County, both in California. *Simidectes merriami* Stock (1933) is easily differentiated from the Texas and Utah specimens on the basis of larger size and the absence of an entoconid or pre-entoconid on P_4 . *Simidectes magnus* is described as being slightly larger than *S. medius*, but neither of these species is well known. The mandible from the Skyline channels is intermediate between the types of *S. magnus* and *S. medius* in depth of mandible and length of M_1 , and probably in length of M_3 judging from alveoli. The M_2 seems to have been slightly larger in the Skyline specimen than in *S. magnus*. The isolated upper molars from Serendipity and Purple Bench are slightly smaller than those referred to *S. medius* by Coombs (Table 1), and otherwise differ only in that the M^2 from Texas has a stronger parastyle and metastyle.

If one considers size alone, the differences are not sufficient to demonstrate the presence of more than one species of *Simidectes* in the Uinta Formation, nor the distinction of either of the two described species from the Texas specimens. Table 2 lists basic statistics for M_1 and M_2 of the Texas and Utah specimens (together) and the Californian *S. merriami*. The coefficient of variation can be expected to range up to about 7.5 in relatively homogeneous single quarry samples of a single species (Simpson, 1947). The lumped Texan-Utah statistics show less variability in M_2 length than is present in a sample of *S. merriami* from a single locality. The V for M_1 for the Texas and Utah specimens, however, is almost twice the figure for the Pearson Ranch sample of *Simidectes*. Nevertheless, it is not outside the range for V of M_1 in living species (Gingerich, 1974), and the Pearson Ranch sample is unusually invariable in this measurement. With such small samples these statistics can only be suggestions, and should be used with great caution. Other differences between *S. magnus* and *S. medius*, for instance, the longer talonid on M_1 of *S. magnus*, may prove to be significant.

I can see no significant differences between the type of *S. medius* (AMNH 1966) and the Skyline mandible except the smaller size of the former. The most visible differences between the type of *S. magnus* and TMM 41580-11 are as follows: hypoconid on P_4 relatively large on *S. magnus*, entoconid on P_4 smaller, talonid (especially the crista obliqua whose high point is the hypoconid) of M_1 relatively longer. No M_3 of either *S. magnus* or *S. medius* is available for comparison to TMM 41745-5. The M^3 (41671-57) from Purple Bench is extremely similar to that illustrated for *S. medius* (Coombs, 1971, Fig. 8), but M^3 is unknown for *S. magnus*.

Table 1.—*Simidectes* measurements.

Specimen	/C	P_4	$M_{\bar{1}}$	$M_{\bar{2}}$	$M_{\bar{3}}$	$P_{\bar{1}}-M_{\bar{3}}$ a	$M_{\bar{1}}^1$	$M_{\bar{2}}^2$	$M_{\bar{3}}^3$	Jaw depth below $M_{\bar{1}}$
	AP	T	AP	T	AP	T	AP	T	AP	T
TMM 41580-11 (Skyline)	9.2	4.8	8.5e	5.3	8.8	5.5	9.1e	—	6.0a	—
TMM 41745-5, -33, -34 (Serendipity)	—	—	—	—	—	—	7.5	4.7	—	—
TMM 41672-57 (Purple Bench)	—	—	—	—	—	—	—	—	—	—
<i>S. medius</i> , type, AMNH 1966	—	—	—	—	8.3	4.9	—	—	—	—
<i>S. medius</i> , referred, PU 14657	—	—	—	—	—	—	7.9	4.9	—	—
<i>S. medius</i> , referred, PU 11317	—	—	—	—	—	—	—	—	5.8	10.6
<i>S. magnus</i> , type, CM 2928	—	—	—	—	9.5	5.2	8.4	5.5	—	—
<i>S. magnus</i> , referred, CM 3006	—	—	—	—	10.5	—	—	—	55e	—
<i>S. magnus</i> , referred, KU 16114	—	—	—	—	—	—	—	—	—	23.5
<i>S. merriami</i> , type and referred, LACM 1139, 1211	—	—	11.5	—	11.1	6.5	10.1	6.5	6.6	4.4
									9.3	13.2
									7.3	10.8
									5.2	7.0
										25.0*

*mean of 9 specimens (Coombs, 1971)

Table 2.—*Simidectes* statistics. R, numerical range; s, standard deviation; V, coefficient of variation; \bar{X} , arithmetic mean.

	N	\bar{X}	R	s	V
M ₁ ⁻ AP, all Utah and Texas specimens	3	8.87	8.3-9.5	.6028	6.8
M ₁ ⁻ AP, <i>S. merriami</i> , Pearson Ranch only	8	10.7	10.1-11.1	.3818	3.6
M ₂ ⁻ AP, all Utah and Texas specimens	4	8.4	7.9-9.1	.6165	7.3
M ₂ ⁻ AP, <i>S. merriami</i> , Pearson Ranch only	5	9.96	8.8-11.0	.802	8.1
M ₂ ⁻ AP, <i>S. merriami</i> , all specimens	8	9.91	8.8-11.0	.62	6.3

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